Complete Summary

GUIDELINE TITLE

Nutrition and physical activity during and after cancer treatment: An American Cancer Society guide for informed choices.

BIBLIOGRAPHIC SOURCE(S)

Doyle C, Kushi LH, Byers T, Courneya KS, Demark-Wahnefried W, Grant B, McTiernan A, Rock CL, Thompson C, Gansler T, Andrews KS, The 2006 Nutrition, Physical Activity and Cancer Survivorship Advisory Committee, American Cancer Society. Nutrition and physical activity during and after cancer treatment: an American Cancer Society guide for informed choices. CA Cancer J Clin 2006 Nov-Dec;56(6):323-53. [244 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Brown JK, Byers T, Doyle C, et al. Nutrition and physical activity during and after cancer treatment: an American Cancer Society guide for informed choices. CA Cancer J Clin 2003;53:268–291.

COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
QUALIFYING STATEMENTS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY
DISCLAIMER

SCOPE

DISEASE/CONDITION(S)

Cancer, including:

- Breast cancer
- Colorectal cancer
- Hematological cancer

- Lung cancer
- Prostate cancer
- Upper gastrointestinal cancer
- Head and neck cancer

GUIDELINE CATEGORY

Counseling
Management
Prevention
Rehabilitation
Risk Assessment

CLINICAL SPECIALTY

Colon and Rectal Surgery
Family Practice
Gastroenterology
Geriatrics
Hematology
Internal Medicine
Nursing
Nutrition
Obstetrics and Gynecology
Oncology
Physical Medicine and Rehabilitation
Pulmonary Medicine
Thoracic Surgery
Urology

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Dietitians
Health Care Providers
Health Plans
Hospitals
Managed Care Organizations
Nurses
Patients
Physical Therapists
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

To present health care providers with the best possible information from which to help cancer survivors and their families make informed choices related to nutrition and physical activity

TARGET POPULATION

Cancer survivors

INTERVENTIONS AND PRACTICES CONSIDERED

1. Nutrition and physical activity-related lifestyle modifications for cancer survivors:
    - Maintenance of healthy body weight
    - Nutrition and food choices
        - Balancing fat, protein and carbohydrate intake
        - Increasing consumption of vegetables and fruits
        - Moderation of alcohol intake
        - Food safety
        - Dietary supplements
    - Increasing physical activity

MAJOR OUTCOMES CONSIDERED

- Treatment outcomes
- Quality of life
- Survival
- Risk of and mortality from cardiovascular and other chronic diseases

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

To synthesize evidence-based research, the American Cancer Society convened a group of experts in nutrition, physical activity, and cancer to evaluate the scientific evidence and best clinical practices related to nutrition and physical activity after the diagnosis of cancer.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The continuum of cancer survivorship includes treatment, recovery, living after recovery, and, for some, living with advanced cancer. Survivors in each of these phases have different needs and challenges with respect to nutrition and physical activity. Both the characteristics of the cancer and therapeutic methods influence these needs.

Cancer and Cancer Treatment

Nutrition During Cancer Treatment

Substantial weight loss and poor nutritional status have been documented in more than 50% of patients at the time of diagnosis, although the prevalence of

malnutrition and weight loss varies widely across cancer types. Maintaining energy balance or preventing weight loss is therefore vital for survivors at risk for unintentional weight loss, such as those who are already malnourished or those who receive directed treatment to the gastrointestinal tract.

Nutritional screening and assessment for survivors should begin while treatment is being planned and should focus on both the current nutritional status and anticipated symptoms related to treatment that could affect nutritional status.

Commonly experienced symptoms of cancer and side effects of treatment that may impact nutritional status include changes in taste or smell, loss of appetite, nausea, vomiting, changes in bowel habits, weight change, loss of lean mass and sarcopenia, pain, and fatigue. If these occur, usual food choices and eating patterns may need to be temporarily adjusted to optimize intake and meet nutritional needs.

During active cancer treatment, the overall goals of nutritional care for survivors should be to prevent or reverse nutrient deficiencies, to preserve lean body mass, to minimize nutrition-related side effects (such as decreased appetite, nausea, taste changes, or bowel changes), and to maximize quality of life.

Suggestions for finding an oncology nutrition expert to provide dietary counseling are provided in the Table below.

Table. Suggestions for Helping Survivors Locate Specialized Dietary Counseling

• Survivors should ask their oncologist for a referral to see a registered dietitian. • If a dietitian does not work in the clinic or medical center where they receive their cancer treatment and care, an appointment with a dietitian associated with their primary care clinic can be arranged. • Survivors and providers can also consult the American Dietetic Association's website [www.eatright.org], using the "Find a Nutrition Professional" feature and putting "Oncology Nutrition" in the expertise/specialty tab, or call the American Dietetic Association at 1-800-366-1655 to identify a dietitian

in their area.

Providing short-term individualized nutritional support can improve appetite and dietary intake and decrease the toxicities associated with cancer treatments. Examples of individualized nutritional therapies include the following:

- For survivors experiencing a reduced appetite, consuming smaller, more frequent meals without liquids can help to increase food intake.
- For survivors who cannot meet their nutritional needs through foods alone, fortified and commercially-prepared or homemade nutrient-dense beverages or foods may improve the intake of energy and nutrients.
- For survivors who are unable to meet their nutritional needs through these measures, other means of short-term nutritional support may be needed, such as pharmacotherapy, enteral nutrition via tube feeding, or intravenous parenteral nutrition.

The use of dietary supplements such as vitamins, minerals, and herbal preparations during cancer treatment remains controversial.

At the present time, most cancer experts advise against taking higher doses of supplements with antioxidant activity during treatment because antioxidants could prevent the cellular oxidative damage to cancer cells that is required for treatments such as radiotherapy and chemotherapy to be effective. In contrast, others have noted that the possible harm from antioxidants is only hypothetical and that there may be a net benefit to help protect normal cells from the collateral damage associated with these therapies. Whether antioxidants or any other dietary supplements specifically are beneficial or harmful is a critical question without a clear scientific answer at this time.

Given this uncertainty, until more evidence is available that suggests more benefit than harm, it is prudent for cancer survivors receiving chemotherapy or radiation therapy to avoid exceeding more than 100% of the daily value for antioxidant-type vitamins such as vitamins C and E during the treatment phase.

Exercise During Cancer Treatment

Despite methodologic limitations and small sample sizes, existing evidence strongly suggests that exercise is not only safe and feasible during cancer treatment, but that it can also improve physical functioning and some aspects of quality of life.

The decision regarding how to maintain or when to initiate physical activity should be individualized to the survivor's condition and personal preferences. In some circumstances, a training program to improve cardiopulmonary fitness before cancer treatments might aid recovery, although adequate research has not been done in this area.

Persons receiving chemotherapy and radiation therapy who are already on an exercise program may need temporarily to exercise at a lower intensity and progress at a slower pace, but the principal goal should be to maintain activity as

much as possible. For those who were sedentary before diagnosis, low-intensity activities such as stretching and brief, slow walks should be adopted and slowly advanced. For older persons and those with bone disease or significant impairments such as arthritis or peripheral neuropathy, careful attention should be given to balance and safety to reduce the risk for falls and injuries. The presence of a caregiver or exercise professional during exercise sessions can be helpful. If the disease or treatment necessitates periods of bed rest, then reduced fitness and strength, as well as loss of lean body mass, can be expected. Physical therapy during bed rest is therefore advisable to maintain strength and range of motion and to help to counteract the fatigue and depression that are often experienced under those circumstances. Some clinicians advise some survivors to wait to determine their physical response to chemotherapy before beginning an exercise program.

Recovery

After cancer therapy has been completed, the next phase of cancer survival is recovery. In this phase, many survivors' symptoms and side effects of treatment that impact nutritional and physical well-being begin to diminish and resolve.

Survivors require ongoing nutritional assessment and guidance in this phase of survival. For those who emerge from treatment underweight or who have compromised nutritional status, continued supportive care, including dietary counseling and pharmacotherapy (e.g., drugs to relieve symptoms and stimulate appetite), is helpful in the recovery process. After treatment, a program of regular physical activity is essential to aid in the process of recovery and improve fitness.

Living After Recovery

During this phase, setting and achieving lifelong goals for an appropriate weight, a physically active lifestyle, and a healthy diet are important to promote overall health, quality of life, and longevity. The American Cancer Society (ACS) has established nutrition and physical activity guidelines for the prevention of cancer (see Table below).

Table. American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention

Maintain a healthy weight throughout life. • Balance caloric intake with physical activity. • Avoid excessive weight gain throughout the lifecycle. • Achieve and maintain a healthy weight if currently overweight or obese. Adopt a physically active lifestyle.

- Adults: engage in at least 30 minutes of moderate-to-vigorous physical activity, above usual activities, on 5 or more days of the week. Forty-five to 60 minutes of intentional physical activity are preferable.
- Children and adolescents: engage in at least 60 minutes per day of moderate-to-vigorous physical activity at least 5 days per week.

Consume a healthy diet, with an emphasis on plant sources.

- Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
- Eat five or more servings of a variety of vegetables and fruits each day.
- Choose whole grains in preference to processed [refined] grains.
- Limit consumption of processed and red meats.

If you drink alcoholic beverages, limit consumption.

- Drink no more than one drink per day for women or two per day for men.

Although it may seem reasonable to assume that following these guidelines would also favorably affect cancer recurrence or survival rates, few data are available to directly support this assumption. In some instances, there is evidence for such a link, as with obesity and breast cancer recurrence, but in many instances the evidence linking food choices and physical activity to cancer recurrence and survival is limited or unclear. Although the scientific evidence for advice on nutrition and physical activity after cancer is much less certain than for cancer prevention, it is likely that following the ACS Guidelines on diet, nutrition, and cancer prevention may be helpful for reducing the risk of developing second cancers. It is also important to realize that, because persons who have been

diagnosed with cancer may be at increased risk for other cancers and for cardiovascular disease, diabetes, and osteoporosis, the guidelines established to prevent those diseases are especially important for cancer survivors.

Convincing data exist that obesity is associated with breast cancer recurrence, and evidence on obesity and prognosis is also accumulating for other cancers. Therefore, achieving and maintaining a healthy weight, as well as consuming a nutrient-rich diet and maintaining a physically active lifestyle, are important to improve overall health and well-being and survival.

An increasing number of studies have examined exercise during recovery and long-term survival after cancer treatment. Exercise has been shown to improve cardiovascular fitness, muscle strength, body composition, fatigue, anxiety, depression, self-esteem, happiness, and several components of quality of life (physical, functional, and emotional) in cancer survivors. Although preliminary, these data suggest that physical activity may be important for reducing the risk of recurrence and extending survival for some cancer survivors.

Living with Advanced Cancer

Although some persons are cured or experience cancer as a controllable chronic disease, others live with advanced cancer. For these persons, a healthy diet and physical activity are important factors in establishing and maintaining a sense of well-being and enhancing quality of life. Although advanced cancer may be accompanied by substantial weight loss, it is not inevitable that persons with cancer lose weight or experience malnutrition. Many persons with advanced cancer may need to adapt food choices and eating patterns to meet nutritional needs and to manage symptoms and adverse effects such as pain, constipation, and loss of appetite. For persons with poor appetite, weight loss, or both, convincing evidence exists that some medications (e.g., megestrol acetate) enhance appetite.

Furthermore, using nonsteroidal anti-inflammatory drugs or omega-3 fatty acid oral supplements may stabilize or improve nutritional status, body weight, and functional status.

Additional nutritional support such as nutrient-dense beverages can be provided for those who cannot eat enough solid food to maintain energy intake. The use of tube feedings and total parenteral nutrition should be individualized with clear recognition of the associated risks for complications.

The evidence of benefit from exercise for advanced cancer survivors is insufficient to make specific recommendations. Recommendations for nutrition and physical activity for persons who are living with advanced cancer are best made based on individual needs and abilities.

Selected Issues in Nutritional and Physical Activity for Cancer Survivors

Body Weight

Throughout the cancer continuum, individuals should strive to achieve and maintain a healthy weight. Some cancer survivors can be malnourished and underweight at diagnosis or as a result of aggressive cancer treatments. For these persons, further loss of weight can impair their quality of life, interfere with completion of treatment, delay healing, and increase risk of complications. In survivors with these difficulties, dietary intake and factors affecting energy expenditure should be carefully assessed. For those at risk for unintentional weight loss, multifaceted interventions should focus on increasing food intake to achieve a positive energy balance and therefore increase weight. Physical activity may be useful to the underweight survivor when tailored to provide stress reduction and to increase strength, but high levels of physical activity make weight gain more difficult.

For cancer survivors who are overweight or obese, modest weight loss (i.e., a maximum of 2 pounds per week) can be encouraged during treatment, as long as the treating oncologists approve, weight loss is monitored closely, and weight loss does not interfere with treatment. Safe weight loss should be achieved through a well-balanced diet that is reduced in energy density and increased physical activity tailored to the specific needs of the person being treated. After cancer treatment, weight gain or loss should be managed with a combination of dietary and physical activity strategies. For some who need to gain weight, this means increasing energy intake (food intake) to exceed energy expended, and for others who need to lose weight, this means increasing energy expenditure (via increased physical activity) to exceed energy intake. Emerging evidence suggests that reducing the energy density of the diet by emphasizing low-energy density foods (e.g., water- and fiber-rich vegetables, fruits, and soups; cooked whole grains) and limiting intake of fat and sugars promotes healthy weight control. The mechanism by which this strategy may be useful is that food volume is not reduced, which may help to avoid hunger and feelings of deprivation. Limiting portion sizes of energy dense foods is an important accompanying strategy. Increased physical activity is also an important element to prevent weight gain, promote weight loss, and most important, to promote maintenance of weight loss in patients who are overweight or obese. For those who need to lose weight, even if ideal weight reduction is not achieved, it is likely that any weight loss achieved by physical activity and healthful eating is beneficial, with weight losses of 5% to 10% still likely to have significant health benefits.

Nutrition and Food Choices

During all phases of cancer survival, even for those with no apparent nutritional problems, the principles outlined in the National Guideline Clearinghouse (NGC) summary of the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention should be regarded as the basis for a healthful diet. These guidelines are similar to those recommended by several other organizations, agencies, and expert panels as a reasonable basis for the dietary prevention of other chronic diseases and cancer.

Balancing Fat, Protein, and Carbohydrate Intake

Protein, carbohydrate, and fat all contribute energy (calories) to the diet, and each of these dietary constituents is available from a wide variety of foods. Informed choices about foods that provide these macronutrients should be based

in goals of achieving variety and nutrient adequacy. Many cancer survivors are at high risk for other chronic diseases. Therefore, the recommended amounts and type of fat, protein, and carbohydrate to reduce cardiovascular disease risk are also appropriate for cancer survivors.

Currently, the recommended level of fat in the diet is 20% to 35% of energy, with saturated fat intake limited to <10% and trans fatty acids limited to <3% of total energy intake. Some studies have suggested that omega-3 fatty acids may have specific benefits for cancer survivors, such as ameliorating cachexia, improving quality of life, and perhaps enhancing the effects of some forms of treatment. These findings are not certain, however, and more research is needed. However, including foods that are rich in omega-3 fatty acids (e.g., fish, walnuts) in the diet should still be encouraged because it is associated with a lower risk for cardiovascular diseases and a lower overall mortality rate, and evidence is largely lacking for a detrimental effect.

Adequate protein intake is essential during all stages of cancer treatment, recovery, and long-term survival. The best choices to meet protein needs are foods that are also low in saturated fat (e.g., fish, lean meat and poultry, eggs, nonfat and low-fat dairy products, nuts, seeds, and legumes). An intake of 10% to 35% of energy from protein, or at least 0.8 g/kg body weight, is recommended for the general population and will generally meet the protein needs of adult cancer survivors.

Healthful carbohydrate sources are foods that are rich in essential nutrients, phytochemicals, and fiber, such as vegetables, fruit, whole grains, and legumes. These foods should provide the majority of carbohydrate in the diet. The recommended level of carbohydrate in the diet is 45% to 65% of energy intake for the general population.

Choosing whole grains and whole grain food products as a source of fiber, rather than relying on fiber supplements, adds nutritional value to the diet.

Limiting sugar consumption is recommended.

A vegan diet, which excludes all animal foods and animal products, can meet protein needs if nuts, seeds, legumes, and cereal-grain products are consumed in sufficient quantities, although supplemental vitamin B12 will be necessary to meet needs for that vitamin. As dietary vitamin D in the United States comes primarily from fortified dairy foods, a vegan diet may also need to include supplemental vitamin D if adequate exposure to the sun or ultraviolet light is not obtained.

A vegetarian diet is consistent with the ACS Nutrition Guidelines for the Prevention of Cancer. However, no direct evidence has determined whether consuming a vegetarian diet has any additional benefit for the prevention of cancer recurrence over an omnivorous diet high in vegetables, fruits, and whole grains, and low in red meats.

Vegetables and Fruits

Higher intakes of vegetables and fruits have been specifically associated with a lower incidence of cancer at several sites, including the colorectum, stomach, lung, oral cavity, and esophagus.

The benefits of eating a variety of vegetables and fruits probably exceed the health-promoting effects of any individual constituents in these foods because the various vitamins, minerals, and other phytochemicals in these whole foods act in synergy. It is reasonable to recommend that cancer survivors adopt the general recommendations issued by the ACS for cancer prevention to eat at least five servings of a variety of vegetables and fruit each day.

Alcohol

Alcoholic drinks up to one or two drinks per day (for women and men, respectively) can lower risk for heart disease, but higher levels do not offer additional benefit and may increase risk not only for complications of alcohol overuse, but also for cancer. For this reason, it is important for the health care provider to tailor advice on alcohol consumption to the individual cancer survivor. The cancer type and stage of disease, treatment, risk factors for recurrence or new primary cancers, and comorbid conditions should be considered in making recommendations. For example, alcohol, even in the small amounts found in mouthwashes, can be irritating to survivors with oral mucositis and can exacerbate that condition. Therefore, it is reasonable to recommend that alcohol intake should be avoided or limited among survivors with mucositis and among those beginning head and neck radiotherapy or chemotherapeutic regimens that put them at risk for mucositis.

Many studies have found a link between alcohol intake and risk for some primary cancers, including cancers of the mouth, pharynx, larynx, esophagus, liver, breast, and probably colon cancer. In persons who have already received a diagnosis of cancer, alcohol intake could also affect the risk for new primary cancers of these sites. Therefore, the degree of risk present should be considered in recommendations regarding individual alcohol consumption.

Food Safety

During any immunosuppressive cancer treatment, survivors should take extra precautions to prevent infection, and they should be particularly careful to avoid eating foods that may contain unsafe levels of pathogenic microorganisms. Because chemotherapy can impair the immune response, raw vegetables and fruits may increase the risk for infection in some patients during immune-suppression treatment (i.e., some chemotherapies and radiotherapies) as a result of bacteria on these foods. By following safe food practices, cancer survivors and their caregivers can reduce the risk of food-borne illness. Refer to the general guidelines for food safety as shown in the Table below.

Table. General Guidelines for Food Safety

• Wash hands thoroughly before eating. • Keep all aspects of food

preparation clean, including washing hands before food preparation and washing fruits and vegetables thoroughly.
- Use special care in handling raw meats, fish, poultry, and eggs.
- Thoroughly clean all utensils, countertops, cutting boards, and sponges that have contacted raw meat; keep raw meats and ready-to-eat foods separate.
- Cook to proper temperatures; meat, poultry, and seafood should be thoroughly cooked, and beverages (milk and juices) should be pasteurized.
- Store foods promptly at low temperatures to minimize bacterial growth (below 40 degrees F).
- When eating in restaurants, avoid foods that may have potential bacterial contamination such as salad bars, sushi, raw or undercooked meat, fish, shellfish, poultry, and eggs.
- If there is any question or concern about water purity (e.g., well water), it can be checked for bacterial content by contacting local public health departments.

Dietary Supplements

During and after cancer treatment, there is a probable benefit of taking a standard multiple vitamin and mineral supplement that contains approximately 100% of the Daily Value because during these times, it may be difficult to eat a diet with adequate amounts of these micronutrients. In contrast, the use of very large doses of vitamins, minerals, and other dietary supplements is not recommended. There is reason for caution in taking high-dose supplements.

There are, however, some indications for lower-dose nutrient supplementation by cancer patients and survivors. These include the following:

- Biochemically demonstrated nutrient deficiency (e.g., low plasma vitamin D levels, B12 deficiency) where dietary approaches have been inadequate.
- Nutrient intakes persistently below recommended intake levels.
- To meet public health recommended levels of intake (i.e., calcium or vitamin D supplementation for bone health, folate among women of child-bearing age planning pregnancy) *if* not contraindicated due to cancer therapy.
- Known health sequelae related to cancer therapy (i.e., bone loss requiring calcium and/or vitamin D supplementation).

Open dialogue between patients and health care providers should occur regarding dietary supplementation to assure there is no contraindication in relation to the prescribed cancer therapy or for longer-term health effects. In turn, health care providers should make an effort not only to provide time to review dietary supplement decisions with patients, but also to stay abreast of recent research in this area, particularly related to potential drug interactions. It is most prudent to encourage cancer survivors to obtain the potentially beneficial compounds from food. A daily multivitamin supplement in amounts equivalent to 100% of the Daily Value is a good choice for anyone who, for whatever reasons, cannot eat a healthful diet, but the need for vitamin and mineral supplements in higher doses should be assessed and discussed on an individual basis.

Physical Activity Issues for Cancer Survivors

Studies have shown that exercise programs can reduce anxiety and depression, improve mood, boost self-esteem, and reduce symptoms of fatigue. In general, physical activity is likely to be beneficial for most cancer survivors who have completed their primary treatments.

Although some cancer survivors can adopt an exercise program independently, many will benefit from referral to an exercise specialist. Survivors should seek individuals who have been certified by an exercise-related professional organization, such as the American College of Sports Medicine. A physical therapist is the appropriate resource for survivors with injuries, pain, or specific postsurgical issues such as lymphedema or amputation. Exercise physiologists receive college training and are certified by various professional organizations to develop individualized exercise programs. Personal trainers are also popular choices for persons who want to increase their fitness and activity levels. Recommendations on the type, frequency, duration, and intensity of exercise should be individualized to the survivor's age, previous fitness activities, type of cancer, stage of treatment, type of therapy, and comorbid conditions. The Table below contains some suggested ways to increase physical activity.

Suggested Ways to Increase Physical Activity

• Use stairs rather than an elevator. • If you can, walk or bike to your destination. • Exercise with your family, friends, and coworkers. • Take an exercise break to stretch or take a short walk.

- Walk to visit nearby friends or coworkers instead of sending an e-mail.
- Plan active vacations rather than only driving trips.
- Wear a pedometer every day and increase your daily steps.
- Use a stationary bicycle or treadmill while watching TV.

Particular issues for cancer survivors may affect their ability to exercise. Effects of treatment may also promote the risk for exercise-related injuries and adverse effects. Specific precautions should be heeded:

- Survivors with severe anemia should delay exercise, other than activities of daily living, until the anemia is improved.
- Survivors with compromised immune function should avoid public gyms and other public places until their white blood cell counts return to safe levels. Survivors who have completed a bone marrow transplant are usually advised to avoid such exposures for 1 year after transplantation.
- Survivors suffering from severe fatigue from their therapy may not feel up to an exercise program, so they may be encouraged to do 10 minutes of stretching exercises daily.
- Survivors undergoing radiation should avoid chlorine exposure to irradiated skin (e.g., from swimming pools).
- Survivors with indwelling catheters should avoid water or other microbial exposures that may result in infections, as well as resistance training of muscles in the area of the catheter to avoid dislodgment.
- Survivors with significant peripheral neuropathies or ataxia may have a reduced ability to use the affected limbs because of weakness or loss of balance. They may do better with a stationary reclining bicycle, for example, than walking on a treadmill.

For the general population, the ACS recommends at least 30 to 60 minutes of moderate to vigorous physical activity at least 5 days per week to reduce the risk for cancer, cardiovascular disease, and diabetes. These levels of activity have not been studied systematically in cancer survivors, but aside from specific circumstances related to treatment or other cancer-specific conditions such as outlined above, there is no reason to think that these recommendations would not also be beneficial for cancer survivors. Therefore, although daily and regular activity may be preferred and may be a goal, any steps that are taken to move from a sedentary to an active lifestyle should be encouraged. If an individual has been completely sedentary, encouragement to take short walks may be appropriate. If someone already exercises three times a week, encouragement to increase this to five times a week may be appropriate. For survivors wanting maximum benefit, the message should be that the health benefits of exercise are generally linear, with increasing health benefit with a higher volume of physical activity. Caution should be noted that extremely high levels of exercise might increase the risk for infections, and the risk of exercise-related injuries should also be minimized.

Nutrition and Physical Activity by Selected Cancer Sites

Breast Cancer

Nutrition and physical activity recommendations to reduce the risks for primary breast cancer and heart disease are especially important for breast cancer survivors. Diets should emphasize vegetables and fruits, low amounts of saturated fats, and sufficient dietary fiber. If soy foods are consumed, intakes should be kept in moderation, and concentrated sources of isoflavones should be avoided. Most importantly, breast cancer survivors should strive to achieve and maintain a healthy weight through appropriate diet and regular physical activity. In addition, regular physical activity should be maintained regardless of any weight concerns.

Colorectal Cancer

Colorectal cancer survivors should be advised to maintain a healthy weight, eat a well-balanced diet consistent with guidelines for cancer and heart disease prevention, and participate in regular physical activity. Colorectal cancer survivors with chronic bowel problems or surgery that affects normal nutrient absorption should be referred to a registered dietitian to modify their diets to accommodate these changes and maintain optimal health.

Hematologic Cancers and Cancers Treated with Bone Marrow Transplantation or Hematopoietic Stem Cell Transplantation

As an infection prevention strategy, low-microbial diets are often prescribed for transplant recipients. A low-microbial or low-bacteria diet is primarily a cooked-food diet because the major limitation imposed is on fresh or uncooked food items. Because many food restrictions are imposed with this strategy, the nutrient adequacy of actual food intake of patients who are prescribed the low-microbial diet should be monitored. Prevention of malnutrition and correction of energy and nutrient inadequacies has been incorporated into the standardized posttransplant treatment at most transplant centers. In a recent review of the evidence relating to the relative effectiveness of enteral nutrition versus parenteral nutrition support, the issue could not be evaluated due to lack of evaluable data. Recent trends include prescribing less parenteral nutrition support and more enteral nutrition support, which could reduce risk of medical complications and control costs.

Lung Cancer

During treatment and the immediate recovery period, lung cancer survivors may benefit from eating foods that are energy-dense and are easy to swallow. Small, frequent meals may be easier to manage than three large meals per day. Medications, omega-3 fatty acid supplements, and nutritional support via energy-dense dietary supplements or enteral nutrition may be helpful for those experiencing weight loss. If nutrient deficiencies are present or survivors cannot eat enough to adequately meet micronutrient needs, a multivitamin–mineral supplement is advisable, either in pill or liquid form. The potential role of physical activity in improving outcomes in lung cancer survivors has not been characterized.

Recommendations for nutrition and physical activity for persons who are living with lung cancer are best made based on individual needs. Striving toward a healthy weight by adjusting food intake and physical activity is a reasonable goal,

as is ensuring that nutritional needs are met with a well-balanced diet and a multivitamin–mineral supplement, if needed to achieve adequate levels of intake.

Prostate Cancer

Men in whom prostate cancer has been diagnosed should consume diets that are rich in vegetables and fruit and low in saturated fat and pursue a physically active lifestyle. Based on studies of prostate cancer incidence, it may also be prudent to consume diets that are moderate in calcium and low in dairy intake, although such dietary suggestions need to be considered in the context of increased risk of fractures from antiandrogen therapy and physical activity patterns. Although the evidence relating these recommendations to prostate cancer recurrence is limited, there are likely substantial other benefits, most prominently decreasing cardiovascular disease risk, which is the major cause of death in prostate cancer survivors.

Upper Gastrointestinal and Head and Neck Cancers

In the absence of more definitive information, survivors of head and neck and upper gastrointestinal cancers should strive to follow the ACS Nutrition and Physical Activity Guidelines for the Prevention of Cancer. High intakes of vegetables and fiber have been shown to be beneficial. Because food intake can be compromised due to the effects of disease or therapy, consultation with a registered dietitian for individualized recommendations is recommended.

Common Questions About Diet, Physical Activity, and Cancer Survivorship

Cancer survivors often request information and advice from their healthcare providers about food choices, physical activity, and dietary supplement use to improve their quality of life and survival. Health professionals who counsel patients should emphasize that no one study provides the last word on any subject, and that individual news reports may overemphasize what seem to be contradictory or conflicting results because they seem to be new, different, or challenge conventional wisdom.

The best advice about diet and physical activity is that it is rarely advisable to change diet or activity levels based on a single study or news report. See the original guideline document for questions and answers that address common concerns of cancer survivors regarding diet and physical activity. The following questions are addressed:

- Does alcohol increase the risk of cancer recurrence?
- Should alcohol be avoided during cancer treatment?
- What do antioxidants have to do with cancer?
- Is it safe to take antioxidant supplements during cancer treatment?
- Will eating less total fat lower risk of cancer recurrence or improve survival?
- Do different types of fat influence cancer incidence and survival?
- Can dietary fiber prevent cancer or improve cancer survival?
- Are there special food safety precautions for individuals undergoing cancer treatment?
- Should I avoid meats?

- Does being overweight increase risk of cancer recurrence and second primary cancers?
- Are foods labeled organic recommended for cancer survivors?
- Should I exercise during cancer treatment and recovery?
- Are there special precautions survivors should consider?
- Can regular exercise reduce the risk of cancer recurrence?
- What are phytochemicals, and do they reduce cancer risk?
- Is including soy-based foods in the diet recommended for cancer survivors?
- Does sugar "feed" cancer?
- Would survivors benefit from using vitamin and mineral supplements?
- Can nutritional supplements lower cancer incidence or risk of recurrence?
- Will eating vegetables and fruits lower risk of cancer recurrence?
- Is there a difference in the nutritional value of fresh, frozen, and canned vegetables and fruits?
- Does cooking affect the nutritional value of vegetables?
- Should I be juicing my vegetables and fruits?
- Do vegetarian diets reduce risk of cancer recurrence?
- How much water and other fluids should I drink?

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence is not specifically stated for each recommendation.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Appropriate nutrition and physical activity during and after cancer treatment
- For long-term cancer survivors, an appropriate weight, a healthful diet, and a physically active lifestyle may improve response to treatment, quality of life, and survival; and prevent recurrence, second primary cancers, and other chronic diseases.

POTENTIAL HARMS

- Particular issues for cancer survivors may affect their ability to exercise. Effects of treatment may also promote the risk for exercise-related injuries and adverse effects.
- Caution should be noted that extremely high levels of exercise might increase the risk for infections, and the risk of exercise-related injuries should also be minimized.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- The underlying premise in creating this report is that, even when the scientific evidence is incomplete, reasonable conclusions can be made on several issues that can guide choices about body weight, foods, physical activity, and nutritional supplement use.
- It is important for both health care providers and cancer survivors to consider the nutritional and physical activity issues discussed in this report within the context of the individual survivor's overall medical and health situation. This report is not intended to imply that nutrition and physical activity are more important than other clinical or self-care approaches. For example, although we present nutritional suggestions for persons with nausea or fatigue, we recognize that other medical interventions may be more important in controlling these symptoms. In writing these suggestions, we have assumed that survivors are receiving appropriate medical and supportive care and are seeking information on self-care strategies to provide further relief of symptoms and to enhance health and improve the quality of their lives.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Patient Resources

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Doyle C, Kushi LH, Byers T, Courneya KS, Demark-Wahnefried W, Grant B, McTiernan A, Rock CL, Thompson C, Gansler T, Andrews KS, The 2006 Nutrition, Physical Activity and Cancer Survivorship Advisory Committee, American Cancer Society. Nutrition and physical activity during and after cancer treatment: an American Cancer Society guide for informed choices. CA Cancer J Clin 2006 Nov-Dec;56(6):323-53. [244 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2003 (revised 2006 Nov)

GUIDELINE DEVELOPER(S)

American Cancer Society - Disease Specific Society

SOURCE(S) OF FUNDING

American Cancer Society

GUIDELINE COMMITTEE

2006 Nutrition, Physical Activity, and Cancer Survivorship Advisory Committee

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Brown JK, Byers T, Doyle C, et al. Nutrition and physical activity during and after cancer treatment: an American Cancer Society guide for informed choices. CA Cancer J Clin 2003;53:268–291.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American Cancer Society Web site.

Print copies: Available from the American Cancer Society, 250 Williams St., Suite 600, Atlanta, GA 30303; Web site: www.cancer.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Kushi LH, Byers, T, Doyle C. Bandera EV, McCullough M, McTiernan A, Gansler T, Andrews KS, Thun MJ, American Cancer Society 2006 nutrition and physical activity guidelines for cancer prevention: reducing the risk of cancer with healthy food choices and physical activity. CA Cancer J Clin 2006 Sep-Oct;56(5):254-81. Available from the American Cancer Society Web site.

PATIENT RESOURCES

The following is available:

- Nutrition for the person with cancer during treatment: a guide for patients and families. Available from the American Cancer Society (ACS) Web site.

Also available by calling 1-800-ACS-2345.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC STATUS

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Date Modified: 9/29/2008